

FINAL EVALUATION REPORT

Technology Opportunities Program (TOP) Grant

Manchester, New Hampshire E-Health Initiative

Implementation of Practice Management and Electronic Medical Record Software:
Elliot Senior Health Center & Child Health Services

Final Evaluation Conducted by:

Patrick Miller, Principal

Pero Consulting Group, LLC
371 Beech Hill Rd
Campton, NH 03223-4304
603.344.8932 (voice)
603.794.8374 (fax)
patrick@perogroup.com

Presented To:

Elliot Health System
1228 Elm St
3rd Floor
Manchester, NH 03101

May 21, 2003

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1. Executive Summary and Key Findings

This report contains report findings on two separate project implementation sites. The first is the Elliot Senior Health Center and the second is Child Health Services. The project management for both implementations was provided by the Elliot Health System.

This report is the result of a review process of both implementations. The review was conducted in March and April 2003. Additional reports required by the TOP Grant closing process will be completed later this year.

The following is a list of key findings:

- The implementation at the Elliot Senior Health Center went smoothly and there is a high satisfaction level amongst the end users.
- The implementation at Child Health Services has had some difficulties with the execution but is currently re-focused and gaining momentum.
- The system is providing administrative cost savings at the Elliot Senior Health Center through reduced transcription expenses, reduced document management expenses, improved work-flow management, reduced days in accounts receivable, and electronic communication with pharmacies and other medical providers.
- While there are current operational benefits and cost reductions with the Epic system, the longer-term possibilities for using the data to develop patient outreach programs and better manage patient care will likely yield the most significant benefits.
- Overall, the project has been successful and will yield long-term benefits to the community through enhanced clinical communication.

Section 2 of this report focuses on the Elliot Senior Health Center implementation, Section 3 focuses on the Child Health Services implementation, and Section 4 contains appendices.

The Child Health Services implementation and Section 4 contains appendices.

2. Elliot Health System Project

2.1. Project Overview

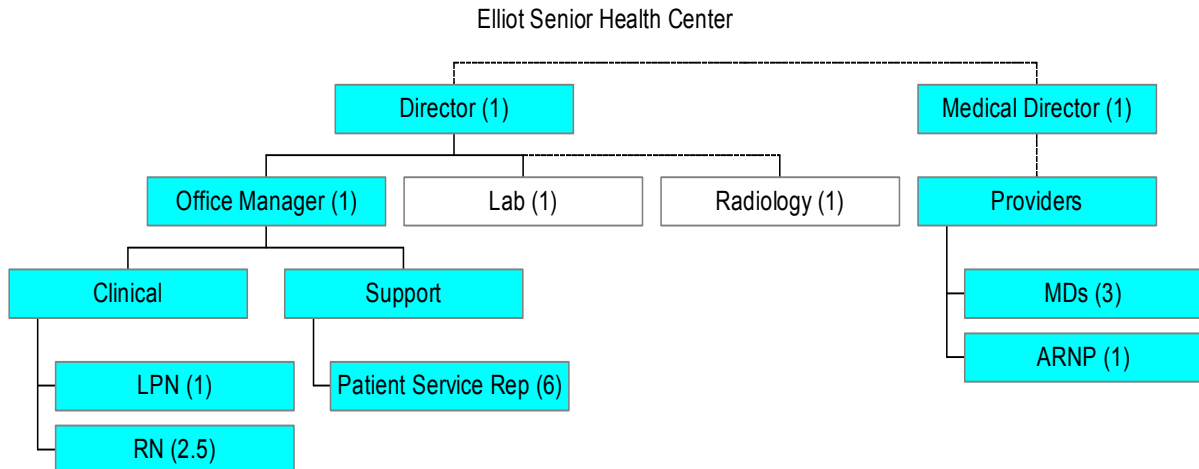
2.1.1. Project Description, Goals, and Measurement Outcomes

Manchester, New Hampshire is the largest city in New Hampshire. According to figures from the 2000 United States Census, the population of Manchester is 107,006, with an extended population of 198,378 in the Manchester Primary Metropolitan Statistical Area (PMSA). One of the two hospitals in the PMSA is Elliot Health System. This non-profit entity is leading the way in medical systems automation with its implementation of several software modules from Epic Systems Corporation throughout the Elliot Health System and several local community health care providers.

The Manchester, New Hampshire E-Health Initiative, funded in part through a TOP Grant, is comprised of the implementation of both a practice management system with multiple modules (i.e., registration, billing, scheduling, medical reference) and a patient electronic medical record (EMR) system. These systems are designed to increase medical practitioner communication in the Manchester community and are being implemented in different iterations in the following locations:

- Elliot Health System – one of two hospitals in the Manchester service area, the parent company of the Elliot Senior Health Center, and the sponsor of the E-health initiative.
- Elliot Senior Health Center – the focus of this report section.
- Child Health Services – a non-profit community health clinic serving underserved residents of Manchester using a team-based approach to medicine. Elliot Health System provides operating funds for Child Health Services (CHS). Section 3 of this report describes the CHS implementation.
- Manchester Community Health Center – a federally qualified health center established to provide medical care services to the underserved.
- Manchester Department of Public Health – one of two city public health departments in New Hampshire, the Manchester Department

This report section focuses on the implementation that specifically took place at the Elliot Senior Health Center. This facility opened in late spring 2002, and is staffed by three gerontologist physicians, one nurse practitioner, a laboratory station, a radiology facility, a gym/physical therapy room, and several office staff. A total of fifteen and a half employees are employed by the Senior Center. The staffing chart is shown below:



The Senior Health Center is the first of its kind in New Hampshire to combine all of these services for this particular demographic group under one roof. Annually, the Senior Center has approximately 9,300 patient visits and currently has 2,300 active patients.

In the original TOP Grant application, four, specific goals were set:

- Providing increased access to health care services information
- Improving communication and coordination among providers of health care
- Facilitating easy access to medical records
- Reducing medical record errors.

The three, originally anticipated project outcomes include:

- The creation of an integrated and coordinated health care network
- Quicker access to services due to instant patient record availability
- Decrease in medical record errors.

This report focuses on how these goals and outcomes were addressed during and after the project implementation. As is detailed below, some of these goals were met quantitatively, whereas others qualitatively. Not all of the measurement systems were in place at the beginning of the project to provide measures that are fully quantifiable. Section 2.2 of this report details the

2.1.2. Project Team Composition

This project used a cross-functional project team, drawing representation from a broad set of disciplines. The Elliot Health System has dedicated project staff that is responsible for the implementation of the Epic system across all of its physician practices, not just the Elliot Senior Health Center and Child Health Services. The project staff is well versed in physician practice management operations as well as the systems required to support the operations.

The original Epic project team composition is attached in Appendix 4.1. During the course of the project, other members were added from the Elliot Senior Health Center.

2.1.3. Project Chronology

The project at the Elliot Senior Health Center was very fortunate in that while several of the physicians had their own practice already, the Center was a brand new facility opening in June 2002. This provided the Elliot Health System with an opportunity to “start fresh” in this location with the Epic system. The result was a rapid implementation and training of staff, both new and existing. It also was an opportunity to open the center with all new operational workflows and procedures centered around the Epic system capabilities. The prior practice had an automated scheduling and billing system, but the electronic medical record portion was new.

A high-level project chronology for the Elliot Senior Health Center project is as follows:

- January 2002-February 2002
 - Project kick off and project team data gathering
 - Hardware assessment and selection
 - Weekly implementation meetings begin
 - Assessment of current physician practice work flows
- March 2002
 - Process and workflow redesign for billing and electronic medical record
- April 2002
 - System software build
 - Hardware installation and testing
- May 2002
 - System testing
- June 2002
 - System goes live

2.1.4. Key Stakeholders

- The primary stakeholders in this project are:
 - Elliot Health System
 - Elliot Senior Health Center
 - Patients
 - Other medical providers.

In interviews conducted with Health Center staff, every one believed that the largest beneficiary of the system were the patients. While the administrative and medical staffs benefited on a daily basis, they all believed that the system was improving patient care, increasing communication with other medical providers, reducing the amount of time required for registration, and streamlining the billing process.

2.2. Evaluation Methodology

2.2.1. Interviews

Interviews were a key part of the evaluation methodology. A total of seven interviews took place between March 6, 2003, and March 25, 2003. They were conducted with Elliot Senior Health Center management, office staff, and support personnel from the parent organization, Elliot Health System. A complete list of interviewed personnel and the role they played in the project can be found in Appendix 4.2.

2.2.2. Surveys

Two surveys were conducted in order to provide evaluation information. Both were two pages in length and copies of the instruments are located in Appendix 4.3 and 4.4.

The first survey was given to staff members of the Elliot Senior Health Center in order to quantify the benefits that the staff perceived from the electronic medical records and practice management software. It centers on both staff and patient benefits. Specifically, it was used to help determine if the following three project goals were met:

- Providing increased access to health care services information
- Improving communication and coordination among providers of health care
- Facilitating easy access to medical records.

All staff members were given the survey on March 21st and a total of seven were returned by March 28th. One manager, one physician, one ARNP, two RNs, and two Patient Service Representatives completed the survey. Results are discussed in section 2.3 of this report.

The second survey was given to a subset of the patient population at the Elliot Senior Health Center. Patients who had medical visits during the week of March 10, 2003, were selected to receive the survey. It was mailed out to these patients during March 2003 and all surveys were received back by April 28. A total of 156 surveys were sent and a total of 74 were returned providing a 47% response rate. Results are discussed in section 2.3 of this report.

2.2.3. Quantitative Methods

In addition to interviews and surveys, several pieces of quantitative data were gathered. This information included:

- Billing and financial data. The number of days in accounts receivable, the number of patient encounters, and insurance carrier information.
- Quality measurement data. The Epic system is able to provide quality measurement data at a physician level as well as on an aggregated basis. This information was reviewed for this report and is described further in Section 2.3.

2.3. Evaluation Findings

The evaluation of the implementation at Elliot Senior Health Center is divided into the following sections:

- Implementation satisfaction
- Patient satisfaction
- Improved quality measurement
- Outreach program development
- Health maintenance topics
- Administrative savings.

Each of these topics is addressed separately below. In their totality, they provide a robust picture of the success of the Elliot Senior Health Center Epic implementation.

2.3.1. Implementation Satisfaction.

End user satisfaction was measured primarily from the interviews conducted and the surveys completed by the staff at the Elliot Senior Health Center. Additional interviews were conducted with members of the Elliot Health System who either participated in the implementation or have ongoing administrative roles with the Elliot Senior Health Center.

In summary, the satisfaction levels of this implementation from a staff perspective are extremely high. From the very first interview conducted, to the comments on the staff surveys, there is a general consensus that this was a very smooth project implementation with limited transition issues.

There were only seven surveys returned by the staff, thus the answers are not statistically valid. Some highlights from the survey results:

- 100 % of the staff were either “Very Satisfied” or “Satisfied” with the ease of use of the Epic system
- 80 % of the staff were either “Very Satisfied” or “Satisfied” with the ability of Epic to help them manage their work
- 88% of the staff were either “Very Satisfied” or “Satisfied” with the ability of the Epic system to improve communication and coordination of services among area healthcare providers.

Other benefits of the system as indicated on the survey:

- The administrative staff stated that they were particularly impressed and pleased by the appointment scheduling capabilities.
- The nurses saw benefits in the ability to electronically communicate medical records information to other health care providers.
- The staff was pleased by the ability to see all patient information in a centralized record.
- The staff saw a benefit to having consistency in the medical information recorded.

- The staff generally believed that the training on the system was excellent.
- The clinicians believe that the patient education database on particular conditions and disease topics was useful as patient visit reference material.

Some of the quotes (positive and negative) heard by staff in interviews and retrieved from surveys included:

- *“..all records available from the Senior Health Center and information from outside (medical) facilities are also available to the staff”*
- *“Able to give patients lab results/x-ray results while in the exam room”*
- *“Easier to access patient information/medical records/history”*
- *“I don’t see any real change in efficiency. Sometimes Epic gets in the way”*
- *“Prescriptions are sent easier to pharmacies”*
- *“Records are easier to transfer to referring physicians”*

2.3.2. Patient Satisfaction

Patient satisfaction was measured using the survey instrument shown in Appendix 4.4. No patient interviews were conducted in person or via telephone. The primary focus of the survey was to determine the level of knowledge patients’ had regarding the electronic medical record system, how much time it took to schedule appointments, and how satisfied they were with the services provided. Patients were also given the opportunity to write general comments.

The survey was intentionally mailed out several weeks after a new operational procedure for patient registration was put in place. This new procedure reduced the number of steps that a patient had to go through to check in for an appointment.

One of the biggest benefits of the electronic medical record is the creation of a Patient Summary Report (Appendix 4.6) after every visit. It summarizes the patient’s vital signs, medication list, issues discussed, and treatment protocol. The patient walks out of the office with this document and they can they share it with their family, share it with other medical providers, and use it as part of their own health record at home. 79 % of patients stated that they read the Summary Report after every visit, whereas 71 % of patients share the Summary Report with family members or other medical providers.

Other survey results:

- 73 % of patients were aware that there was an electronic medical record in place at Elliot Senior Health Center
- 75 % of patients believed that such a record improves patient care
- 89 % of patients stated that the registration/check-in process is fast and easy
- 95 % of patients stated that when they needed to change an appointment it was done quickly

- 26 % stated that they shared information from their Patient Summary Report with other doctors
- 68 % of patients were served by the Elliot Senior Health Center for greater than 6 months.

Below are some of the patient comments (positive and negative) retrieved from the survey:

- *“I love it (Patient Summary Report)! It helps me to remember everything discussed (during patient visit)”*
- *“I like the set up and feel at home when I visit”*
- *“After being open for close to 9 months things are running much more smoothly. It always takes time for anywhere to work out kinks.”*
- *“Never offered to me – I would like to read it (Patient Summary Report)”*.

2.3.3. Improved Quality Measurement

As part of its quality of care program, the Elliot Health System reviews certain measures of patient medical charts to ensure that timely and complete medical records are kept. This is important for both quality of care measures as well as accurate and timely billing of medical care rendered. Nineteen practice locations are involved in this review.

Prior to the Epic system implementation these reviews were performed manually. This manual chart review did not allow for typically more than 5 percent of the charts to be reviewed quarterly for those patients who had an appointment. With the implementation of the Epic system, 100% of the charts can now be reviewed in an automated fashion for allergy and signed and dated entries. Other areas of review are currently being automated where possible

There are seven key medical chart indicators that are reviewed:

1. Complete list of immunizations given and or patient reported
2. Known significant medical diagnosis
3. Patient’s allergy status is documented during each encounter
4. Medication list, both over-the-counter and prescription
5. Signed and dated entries
6. Consult reports dated and initialed
7. Evidence of Advanced Directives.

Below (Table 1) is the Elliot Senior Health Center data for these seven chart indicators. The data is for FY 2003 Q1 and Q2. Data for FY 2002 Q4 is not available for Table 1.

Table 1

Elliot Senior Health Center	FY'03 Q1		FY'03 Q2	
	Yes	No	Yes	No
Complete immunization list	100.00%	0.00%	100.00%	0.00%
Known significant medical diagnosis	92.00%	8.00%	96.00%	4.00%
Known adverse and allergic drug reactions	84.00%	16.00%	96.00%	4.00%
Known chronic medications, including OTC	100.00%	0.00%	100.00%	0.00%
All entries signed/dated (If initials used, signature sheet must be completed)	100.00%	0.00%	100.00%	0.00%
Consults, labs and reports are initialed and date by primary physician to signify review/follow-up plans documented	100.00%	0.00%	100.00%	0.00%
Evidence of known advance directive in the medical record	0.00%	100.00%	68.00%	32.00%

The following table (Table 2) shows the auditing statistics for the past three quarters for each medical indicator:

Table 2

Medical Indicator	Q4 FY'02	Q1 FY'03	Q2 FY'03	RESULT
Complete Immunization list	27.2	17.52	15.29	Decreased
Percent of records with known Significant Medical Diagnosis not documented	4.44	7.69	8.81	Increased
Percent of records without allergy verification	12.22	12.15	8.81	Decreased
Percent of records without updated medication list	5.6	5.98	5.49	Decreased
Percent of entries not dated and signed	N/A	2.14	1.96	Decreased
Percent of consult reports not dated and initialed	3.3	5.13	3.14	Decreased
Percent of records lacking evidence of Advance Directives	82.6	58.97	45.88	Decreased

The figures above are representative of all nineteen physician practices within the Elliot Health System of which the Elliot Senior Health Center is one. The largest improvement has been in the reduction of records lacking Advance Directives. Other significant medical improvements include the documentation of a complete immunization list, the reduction in records without allergy verification, and the reduction in records without an updated medication list. Indicators five and six are important in that they are required for the billing system. Without a record being closed, the bills are not generated.

Overall, the Epic electronic medical record allows for an increased level of audited charts as well as the improved performance of appropriate measures.

2.3.4. Outreach Program Development

One of the greatest benefits to the patients of the Elliot Health System can be found in the ongoing development of patient outreach programs. Using data extracted from the Epic billing and EMR systems, patients can be identified who need services based upon prior diagnosis. This information is currently being used to develop targeted, outreach programs to ensure that patients are being seen when appropriate.

This use of Epic's data is very innovative and exactly why the Epic system was purchased in addition to the process improvement activities mentioned elsewhere in this report. Very few organizations the size of Elliot Health System are doing this type of work nationally and regionally.

Four areas where programs for seniors are currently under development are shown in Table 3:

Table 3

Program Area	Elliot Criteria	Reporting Began	Outreach Began
Diabetes	HBA1C Lipids Panel Creatinine Microalbumin Diabetic Foot Exam Diabetic Eye Exam	March 2003	Spring 2003
Blood pressure	TBD	TBD	TBD
Lipid levels	TBD	TBD	TBD
Hypertension ¹	>=170 / >=100 No scheduled visit in next 3 months	September 2002	September 2002

Each of these programs will consist of the following elements:

1. Developing standards for how often patients need preventive and other treatment for each of these conditions;

¹ A second report is underdevelopment >= 150 / >= 85 at the last two visits and no appointment scheduled in the next 3 months.

2. Mining the billing and electronic medical record to determine which patients have a set condition;
3. Identification of primary, secondary and tertiary patient populations;
4. Determining which patients are meeting the treatment criteria;
5. Telephoning or sending letters to those patients that need treatment and helping them schedule visits;
6. Repeat the above cycle.

Ultimately, these programs will be part of the physician compensation program. Physicians will be provided with regular reporting as they are beginning to receive today, but a portion of their salary will be at risk. Programs such as this are almost impossible to develop without an integrated billing and electronic medical record system, as the data is less reliable and less complete. Future compensation programs will likely also include patient satisfaction survey data to help provide a more complete picture. Currently, Press Ganey patient satisfaction surveys are conducted regularly.

Staff at Elliot has attempted to find benchmarking information from other Epic customers, but these customers have been unwilling to share (for the most part) their report methodologies and results. This is an area that likely should be pursued with the Epic users group. Other program goals include the linking of inpatient medical care information with this data. This is difficult as the Elliot Hospital is on a separate billing and electronic medical record system currently.

2.3.5. Health Maintenance Topics

The parent company of the Elliot Senior Health Center is using data extracted from the scheduling and electronic medical record systems to develop new quality of patient care measures as well as to better measure existing measures. This information is used by each of the physician practices to help monitor the quality of the services provided.

Health Maintenance Topics are designed to help physicians manage routine and chronic patient care.

These items include the following:

- Tetanus
- Pap smear
- Mammography
- Pneumonia vaccine
- Pediatric lead screening
- Cholesterol
- Lipids
- Prostate specific antigen.

The standardized tracking of this information went live in February 1, 2003, and several reports are available while others remain under development. The future

reporting periods are likely to be quarterly with an outreach mechanism for certain topics. The reports have limited data at this time, and will not be fully functional for four to six months.

2.3.6. Administrative Savings

In addition to the satisfaction and clinical quality improvements, this implementation has resulted in sizable administrative savings for the Elliot Senior Health Center. The savings are broken down into five categories in the following Table 4:

Table 4

Savings Description	Detail	Savings
Reduced Transcription Expenses	Prior to Epic being implemented, physicians used costly transcription services to translate their medical notes and place them in the patient chart. Epic eliminates the need for transcription services because the electronic medical record assumes this function.	\$ 1,000 per physician per month equates to \$ 36,000 per year in transcription savings for the Elliot Senior Health Center.
Reduced Days In Accounts Receivable	Improved cash flow has been one of the benefits of the Epic system. Across all of the physician practices owned by Elliot Health System, a 40% lower number of days in accounts receivable exists compared to Statewide New Hampshire physician practice averages.	While the savings are substantial, this financial information is proprietary to the Elliot Health System.
Reduced Document Management Expenses	Management of the formerly paper patient medical records has been streamlined using Epic. Records provided by other physician offices are now scanned into the patient medical record. Clinicians and authorized staff can retrieve all medical records electronically.	The result has been the elimination of a full-time medical records staff person. Additional savings have been achieved by allowing anyone with the proper system access to be able to retrieve necessary records. These savings are more difficult to quantify and also contain “savings” in the form of improved medical care.

Savings Description	Detail	Savings
Improved Work Flow Management	Through the enhanced work flows offered by the Epic system, the Elliot Senior Health Center is seeing efficiencies in their registration, billing, and patient work flows.	Difficult to quantify, but “soft” savings are believed to exist.
Electronic Provider Communication	Prior to Epic, if another physician practice requested patient records, they would have to be manually retrieved, copied, and faxed or mailed. Today with Epic, the records are electronically retrieved and then automatically faxed to the provider.	Reduced handling and postage costs. Increased satisfaction from patients and health care providers on timeliness of information turn around.

2.4. Lessons Learned

Overall, this was a very successful project implementation and its success a testament to the project management and practice management skills of the Elliot Health System. Based upon the reviewer’s discussions with the individuals associated with this project, there were several “lessons learned” that can be shared with future TOP Grant recipients”

- Executive Sponsorship is Vital. Part of the success of this project was due to the strong executive sponsorship received. Senior management within Elliot Health System, administrators and physicians alike, were supportive of this project from the time the project was just an idea to the time of project completion. It was a high-profile project within the Elliot Health System and the community.
- Project Management Discipline is Important. The success of a large-scale systems implementation such as this one is largely dependent upon strong project management resources. Fortunately, the Elliot Health System has developed these resources internally over the past few years. This allowed them to be able to manage the implementations internally and build the skills and knowledge they needed particular to their own organization. The other option would have been to outsource the project management of Epic system. The issue with outsourcing is that the organization runs the risk of losing key knowledge once the project has ended.
- Taking a “Clean Slate” Approach is Ideal. This systems implementation project had the advantage of being able to coincide with the opening of a new medical facility. This allowed for the project architect to design and implement completely new operational and system work flows to support Epic and the Elliot Senior Health

Center. Staff was not forced to re-learn a particular system and operational work flows.

- Previous Successes Build Future Successes. The implementation at the Elliot Senior Health Center occurred after more than a dozen prior implementations at other Elliot Health System physician practices. Because of this, the assembled project team was both very experienced with physician practice management operations as well as the Epic system itself. This prior experience translated to a smooth implementation at the Elliot Senior Health Center.

2.5. Next Steps

There are two pieces of the original TOP Grant application that need to be implemented. The first is developing an electronic linkage between the Elliot Health System's laboratory system and the electronic medical record system at the Manchester Community Health Center (MCHC). This will be a HIPAA-compliant, HL-7 interface. Additionally, so that the Elliot Health System personnel can have access to electronic medical records for MCHC patients, a remote computer will be placed in the Elliot Hospital emergency room. This project is currently in progress.

The second and final piece of the original TOP Grant application that needs to be implemented is a pilot program with the Manchester Health Department. While still being defined, this project will consist of implementing one or more Epic terminals in the Manchester school nursing program. This will allow the nurses to access and update medical records of students that are seen by Elliot Health System pediatricians. There are issues surrounding the new Healthcare Information Portability and Accountability Act (HIPAA) privacy legislation that must be addressed before this project moves forward. It is expected that the project scope assessment for the Manchester Health Department project will be completed in 2003.

3. Child Health Services Project

3.1. Project Background

Child Health Services (CHS) is a non-profit agency that provides comprehensive health care services to families who cannot afford to pay. Eligible families must have at least one child who is under the age of three years old. CHS serves thousands of disadvantaged children every year. All are from families with incomes less than 185% of the poverty level. Ninety-one per cent of clients are enrolled in Medicaid program.

The project that took place at CHS began with the goals of improving the health status of disadvantaged members of the Manchester, New Hampshire community as well as the collaboration between two, distinctly different organizations. Elliot Heath System (EHS), a comprehensive, integrated medical delivery system, sponsored the project and administered the TOP Grant funding. The project consisted of implementing a new practice management and electronic medical record system from a company named Epic. This new system would replace an aging and failing older system at Child Health Services.

CHS receives support from EHS in several ways. First, the EHS directly provides \$150,000 per year for CHS' programs. Second, the EHS occupies two Board seats at CHS. Finally, EHS directly supports one full time equivalent (FTE) in the CHS Social Services division.

The implementation at CHS was done in a phased approach, and due to implementation issues, the original go-live dates were later moved. The implementation at CHS was not as smooth as the one at Elliot Senior Health Center. There were multiple contributing factors to the problems that occurred during the implementation. These will be discussed below in the Lessons Learned section of this report. They are valuable lessons which can be shared with future TOP Grant recipients.

3.2. Project Description and Goals

The project at Child Health Services (CHS) consisted of two phases: 1) implementation of the Epic practice management software to enable patient registration, billing, and referrals, and 2) implementation of the Epic electronic medical records software to enable the medical staff at CHS to have the same advantages of the rest of the Elliot Health System physicians.

The original go-live date for Phase 1 was January 2002, while the Phase 2 date was May 2002. Both of these dates were pushed out during the course of the project and are further detailed in the Project Chronology section below.

The four specific goals stated in the original grant application included:

- Providing increased access to health care services information
- Improving communication and coordination among providers of health care
- Facilitating easy access to medical records
- Reducing medical record errors.

The three specific anticipated outcomes stated in the original grant application included:

- The creation of an integrated and coordinated health care network
- Quicker access to services due to instant patient record availability
- Decrease in medical record errors.

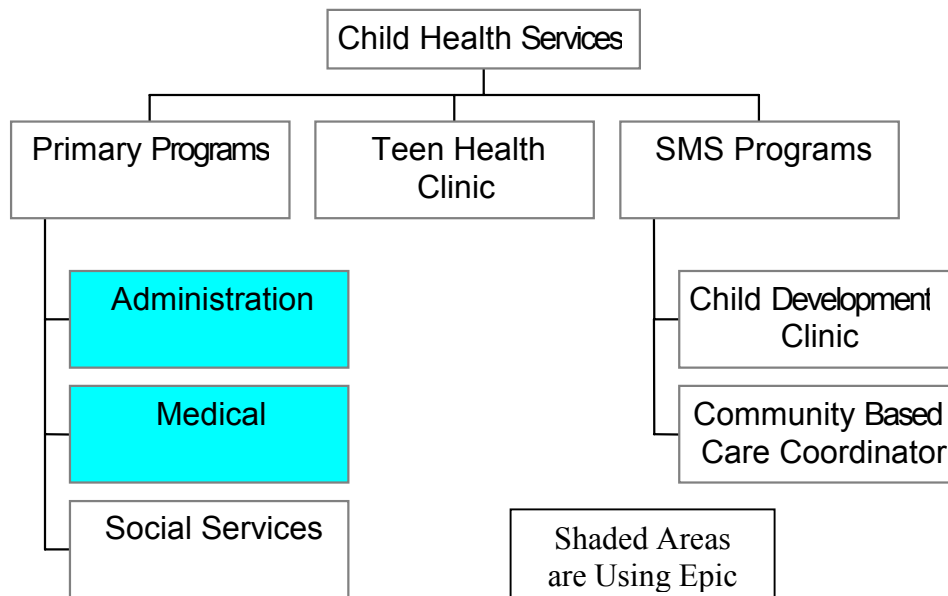
The majority of the goals and outcomes are focused upon the successful implementation of the electronic medical records system. To date, that system has not yet been implemented at CHS, but it is scheduled for June of 2003. Given this, the majority of this evaluation will focus on the project's timeline and management, as well as the issues that occurred during the past eighteen months.

3.3. Evaluation Methodology

All of the data presented in this report is based upon qualitative information provided by individuals who were interviewed, as well as project timelines and other Epic system documentation. There were no patient or staff surveys conducted, as was the case with the Elliot Senior Health Center. Interviews were conducted in March 2003, as part of the Child Health Services (CHS) review process. A complete list of interviewees is found in Appendix 4.5.

3.4. Evaluation Findings

The implementation of Child Health Services (CHS) has had some successes as well as some difficulties. When the initial grant application was conceived, the goal was to roll the Epic practice management and electronic medical records system to the entire organization. As can be seen in the organization chart below, only two divisions of the organization (Administration and Medical) are using the practice management system today. These same two divisions will ultimately also be using the electronic medical record system.



In the fall of 2002, these two divisions as well as the Social Services division went live with the practice management portion of the Epic system. The patient registration

process has caused significant issues for the billing and collections function at Child Health Services, thus impacting cash flow negatively. Elliot Health System (EHS) had recommended workflows for the patient registration process that limited the number of CHS employees that would have access to the system. Instead, CHS opted to implement the system across the entire group of Social Services employees, resulting in fifteen to eighteen individuals with system change access (versus inquiry only) to the registration system. This was done in order to accommodate the social services department's charting and medical record model pursuant to their unique medical care model.

The result of this is that the system became full of duplicate patient records, wrong addresses, and other, incorrect billing information. This caused issues with the billing that has resulted in a 50-60% denial rate of claims submitted for payment. It is estimated that 90% of these rejections are due to registration errors. This has had a direct impact on reducing cash flow at CHS, an organization that runs on thin margins to begin with.

In March of 2003, a decision was made by EHS and CHS to halt the Social Services Division implementation and re-direct resources to fixing the registration and billing issues. Work was slated to re-start on the electronic medical records portion of the project in late spring 2003. A detailed project chronology can be found in the next section of this report.

3.5. Project Chronology

The following is a chronology of key events during the implementation at Child Health Services (CHS):

- April 2001 – Andy Davies, Elliot Health System (EHS), submits TOP Grant application
- October 2001 – TOP Grant announces award to EHS. Andy Davies begins implementation and acts as project manager to develop scope.
- January 2002 – Original anticipated date for practice management system go-live. Date readjusted for September 2002.
- January 2002 – Requirements gathering and weekly partnership meetings begin.
- May 2002 – Original anticipated date for electronic medical record system go-live. Date readjusted for January 2003.
- May 8, 2002 – Andy Davies leaves EHS.
- June 12, 2002 – Rich Herman, EHS Physician Practice Services, is tapped as the new project lead.
- August 2002 – Marjorie Zygmunt hired as Director of Administration at CHS. She is replacing the former administrative project lead that left the company. Began her Epic training.
- September 2002 – Medisense system stopped being used as the primary registration and billing system at CHS. No new activity is entered on the system, but open records need to be “worked down”.

- September 2002 – Epic Registration and Billing begin in the medical and social services divisions of CHS.
- October/November 2002 – Billing collection issues are noticed and EHS provides workflow advice and additional training. The EMR implementation slated for January 2003 is placed on hold.
- December 2002 – CHS and EHS continue to meet to review workflows, system usage, and financial situation at CHS. Formal management meetings are set every three weeks. A decision is made not to launch the electronic medical record for January.
- January 2003 - CHS approached EHS and proposed that the Social Services division not use the electronic medical record portion of the system.
- March 17, 2003 – CHS financial situation is still in distress. Decision made and communicated to CHS that EHS would end the Social Services implementation. A new project plan is agreed to by both parties:
 - March 24, 2003 – CHS Social Services division returns to a paper registration process and is removed from the Epic system.
 - CHS dedicates staff to financial issues and EHS dedicates one FTE as well.
 - Progress meetings set for every two weeks.
 - Medical staff will begin training in mid-April on the electronic medical record system with an anticipated go-live date of June 1st. Social services division of CHS will not be a part of this implementation.
 - The EHS Abstraction Team will begin the medical record conversion at CHS beginning on May 1st.
 - May 1st will be the date when a final decision is made on whether everyone is ready for the June 1st EMR launch date.

3.6. Lessons Learned

Based upon the reviewer's discussions with the individuals associated with this project, there were several "lessons learned" that can be shared with future TOP Grant recipients. The majority of these lessons are based upon two factors: resource availability and the attempted partnership of distinct organizational entities.

- Stakeholder Buy-In, Partnership vs. Ownership, and Project Scope. The implementation at Child Health Services (CHS) was different from every other implementation of the Epic system within the Elliot Health System (EHS) for two reasons. First, the medical care delivery model at CHS is unique. It contains a social services and a medical services component. Second, CHS is not a subsidiary of the EHS, unlike all of the other offices where the Epic system had been previously deployed.

From the beginning, CHS was concerned about their own autonomy as an organization and wanted to ensure that this system implementation was not viewed by its employees as a "take over" by the much larger, Elliot Health System. The cultures of the two organizations were different, and the implementation of a core

information system could be perceived as a threat by CHS employees. During the implementation, the project team at the EHS felt that its operational workflow recommendations (based upon twenty previous implementations) were not being heeded. CHS was attempting to preserve its medical care model. If CHS had been a direct subsidiary of EHS, the outcome may have been different as they could have a stronger say in the project rollout. In retrospect, the partnership between the two organizations fell down, and together both parties should have perhaps examined the workability of the software within the CHS care model. Both CHS and EHS concur that the project team did its best during implementation to convince CHS to use standard operational workflows that the project team had developed. Both parties wanted the system to work. Due to the unique medical model of CHS and the persistence of key CHS employees, these were not followed, thus resulting in the operational and financial issues described elsewhere in this report.

Given this, the lesson learned is that more time could have been spent up front working on the cultural compatibility issues between the two organizations before leaping into the implementation. A partnership between organizations, especially between a very large and a smaller organization, is a very different relationship than a parent-subsiary relationship.

- Resources and Technical Knowledge. Resources provided for this project were likely disproportionate and inadequate in retrospect. While the project team from EHS had worked together on many installations of the same software platform and was trained and experienced in project management techniques, CHS as a smaller organization was not able to dedicate the same amount of resources to this project. The project overwhelmed the limited CHS resources. The project co-leaders initially assigned by CHS had full time responsibilities as the Director of Social Services and as Office Manager. For a project of this magnitude, that was probably not adequate. Additionally, the Office Manager left the organization due to family medical issues less than two months prior to go-live. The fact that this departure was just prior to go-live probably added to the confusion. CHS' Director of Administration has now taken on the project manager role with the Executive Director serving as the sponsor and providing direct oversight.
- System Understanding. This implementation suffered from a very common issue with systems implementations. The individuals who were receiving the technology did not have a complete understanding of how the system functioned and the ramifications of their operational procedures on data integrity. For example, it was initially recommended that only two individuals manage the patient registration process. This was so that those individuals could act as filters for the data being entered into the system and also to optimize the work flow. Instead, the Social Services Division gave system access to more than a dozen people who through inconsistent data entry and updating practices created havoc with the data integrity of the patient records. The downstream effect resulted in billing and collection issues. Systems such as Epic are very good at integrating multiple functions (registration

and billing for example) but they are also extremely susceptible to data integrity issues. What is entered on one screen typically has downstream implications for other screens or processes. Initial system training can address this, but more often than not, data integrity is the result of adherence to operational procedures and vigilant data quality procedures.

- Project Support Team. Everyone that has been involved with the Epic implementation at CHS has repeatedly stated that the support of the project team at EHS was excellent. This included the project management, documentation, workflow proposals, and post-implementation business and technical support. The team has worked together for several years and has implemented the Epic system in twenty practices. The team brings real-world knowledge of issues that occur and uses this knowledge proactively to try to avert any adverse situations.
- Initial Project Vision. The initial project vision – to improve care in the greater Manchester community through electronic medical record access – was excellent. It is clearly the direction in which the healthcare industry is migrating nationally, and Manchester, being a close-knit community, can clearly take advantage of this technology.

The vision also included private and public sector partnerships across four organizations. This type of partnership is important in many ways, especially when resources are limited and need to be appropriately distributed. It is also a difficult partnership to manage during an implementation as complex as this one due to inefficiencies created in a collaborative versus authoritative relationship between organizations.

3.7. Next Steps

Next steps for Child Health Services (CHS) include the roll out of the electronic medical record portion of the Epic system. This should bring administrative savings to CHS and also provide medical benefits similar to those seen in the Elliot Senior Health Center implementation. Elliot Health System (EHS) will continue to maintain the Epic system hardware and provide project team support to CHS.

The Executive Director states that the Epic system is a “great opportunity and a great product”. The problems encountered to date have been “problems of process and project management, not the product (Epic) itself.” As of the end of April 2003, the turnaround plan for CHS was well underway and the project was back on track. The electronic medical record portion will go-live in June 2003. The TOP Grant assessment of the electronic medical record implementation at CHS will be conducted in late 2003. Additionally, there will be a follow-up conducted during the post-implementation phase of the electronic medical record. This information will also be reported to the TOP Grant funders.

4. Appendices

4.1. Original Epic Project Team

This was the original list of project team members assembled in the Fall of 2001. During the course of the project, there were several additions and deletions.

- Andrew Davies, Vice President, Management Services Organization
- Keith Lammers, MD, Vice President/Medical Director of Ambulatory Services
- Steven Schwartz, MD, Physician Champion, Electronic Medical Record Implementation
- Louis Nackman, MD, Pediatric Physician Champion, Electronic Medical Record Implementation
- Richard Herman, Director of Operations and Finance
- Richard Morel, Project Manager
- Cynthia McDonald, MS, RN, Clinical Application Coordinator/Trainer, Electronic Medical Record
- Kerry McKearney, Application Coordinator/Trainer, Electronic Medical Record
- Patricia Kumph, Application Coordinator/Trainer, Electronic Medical Record
- James Conlon, Application Coordinator/Trainer, Electronic Medical Record
- Celeste Bourque, Application Coordinator/Trainer, Electronic Appointment Scheduling
- Lucie Hayes, Application Coordinator/Trainer, Electronic Appointment Scheduling
- Suzanne Gosselin, Application Coordinator/Trainer, Patient Account Billing and Management
- Melissa Lockwood, Application Coordinator/Trainer, Managed Care Coordination

4.2. List of Interviewees for Elliot Senior Health Center Project

- Beverly Aajberg, Director of Senior Services. Ms. Aajberg has day-to-day operational, marketing, and patient responsibilities for the Elliot Senior Health Center.
- David Coffey, Office Manager. Mr. Coffey is responsible for the billing, scheduling, and other operational aspects for the Elliot Senior Health Center.
- Lisa Jordan, Director of Business Operations. Ms. Jordan is responsible for billing for all Elliot physician practices.
- Rich Herman, Director of Operations and Finance, Elliot Physician Services.
- David Li, Vice President Marketing and Strategic Planning Elliot Health System. Mr. Li was one of the original grant writers for the TOP Grant.
- Richard Morel, Epic Project Manager. Mr. Morel was the lead project manager who implemented the Epic system.

- Barry Sheppard, Manager, Performance Improvement. Mr. Sheppard is responsible for developing disease management and patient outreach programs using medical and billing data.

4.3. Staff Epic Survey – The text of the survey (un-formatted) is contained below.

Elliot Senior Health Center Staff Epic Survey

Purpose: The purpose of this **two-page** survey is to gather input regarding the implementation of the Epic system. This is being done as part of a larger summary report being generated for the funders of the grant that supported the Epic installation. Your responses will be held in confidence. It should take you no more than 10 minutes to complete.

1. Today's date: March _____, 2003
2. Your position title: _____
3. Length of employment with the senior health center: ____/____ (months/years)
4. On a scale of 1-5, please indicate how you would rate the following benefits that you receive from using the Epic system in your position: (1=No Benefit, 2=Low Benefit, 3=Moderate Benefit, 4=High Benefit, 5=Excellent Benefit)

a. More time to devote to patient care	1	2	3	4	5
b. Increased access to patient medical records	1	2	3	4	5
c. Coordination of patient medical information	1	2	3	4	5
d. Historical reference of patient medical information	1	2	3	4	5
e. Faxing prescription orders to the pharmacy	1	2	3	4	5
f. Improved patient communication	1	2	3	4	5
g. Method of improved patient education	1	2	3	4	5
h. Easy to make/re-schedule appointments	1	2	3	4	5
i. Easy to check-in patients for their visit	1	2	3	4	5
j. Other benefits: _____					
5. On a scale of 1-5, please indicate how you would rate the following benefits that your patients receive from using the Epic system: (1=No Benefit, 2=Low Benefit, 3=Moderate Benefit, 4=High Benefit, 5=Excellent Benefit)

a. Check-in is more streamlined	1	2	3	4	5
b. Appointments are easier to schedule/re-schedule	1	2	3	4	5
c. Patient Visit Summary document	1	2	3	4	5
d. Medical library information	1	2	3	4	5
e. Better communication with their physician(s) outside of the Elliot Senior Health Center	1	2	3	4	5
f. Faster to get prescriptions filled	1	2	3	4	5
g. Other benefits: _____					
6. Describe how patient care efficiency has increased since the Epic system was implemented:

7. The Epic system improves communication and coordination of services among area health care providers: *(circle one)*
Strongly Agree Agree Neutral Disagree Strongly Disagree
8. How would you rate the impact of the Epic system on your ability to manage your work? *(circle one)*
Very Positive Positive No Impact Negative Very Negative
9. Describe how your work activities have changed since the Epic system was installed:

10. Describe how your patient interactions have changed since the Epic system was installed:

11. Would you consider the Epic system training you received to be: *(circle one)*
Excellent Very Good Fair Poor Very Poor
12. Please provide any comments you have regarding the Epic training:

13. What would you consider to be the largest benefit of the Epic system to the Elliot Senior Health Center:

14. Please provide any additional comments regarding the Epic implementation or your day-to-day use of the Epic system:

15. Overall, how satisfied are you with the ease of use of the Epic system: *(circle one)*
Very Satisfied Satisfied Neutral Unsatisfied Very Unsatisfied
16. Your name (optional): _____
17. If you provided your name, may we contact you directly if we have any further questions? Yes or No (please circle one)

4.4. Patient Epic Survey – The text of the survey (un-formatted) is contained below.

Elliot Senior Health Center Patient Survey

Purpose: The purpose of this brief survey is to gather patient feedback on the Elliot Senior Health Center's scheduling and electronic medical records system. All information will be kept confidential and survey instruments will be destroyed within six months. It should take you no more than 10 minutes to complete this survey. Please mail it back in the enclosed envelope by April 28, 2003.

1. Today's date: March _____, 2003
2. How long have you been served by the physicians and other services of the Elliot Senior Health Center: *(circle one only)*
<3 months 3-6 months 6-12 months >1 year
3. How often do you receive services at the Elliot Senior Health Center: *(circle one only)*
 - a. Less than once per week
 - b. Once per week
 - c. 1-2 times per week
 - d. 3-4 times per week
 - e. Every day
 - f. Other: _____
4. Please indicate the Elliot Senior Health Center services that you have used to date:
(circle all that apply)
 - a. Medical Care
 - b. Lab Work
 - c. Radiology Work
 - d. Physical Therapy
 - e. Gym
5. When you visit the Elliot Senior Health Center, the registration/check-in process is:
(circle one only)
 - a. Fast and easy
 - b. Takes more time that I think it should
6. When you need to change an appointment date or time, this is: *(circle one only)*
 - a. Done quickly
 - b. Takes a lot of time
7. After you receive medical care at the Elliot Senior Health Center, how often do you read the Patient Summary Report? *(circle one only)*
 - a. Always after every visit
 - b. Sometimes after every visit
 - c. Never after every visit

8. How do you use the Patient Summary Report that your physician gives you after your visit? *(circle all that apply)*
- a. I share information regarding my visit with my other doctors
 - b. I share information regarding my visit with my spouse, partner or family
 - c. I do not receive a Patient Summary Report
 - d. I do not know what a Patient Summary Report is
9. Are you aware that the Elliot Senior Health Center uses an Electronic Medical Record system to coordinate care and manage all of your medical information? Yes or No *(circle one only)*
10. I believe that an Electronic Medical Record: *(circle one only)*
- a. Improves patient care
 - b. Reduces patient care
 - c. I do not have an opinion
11. Your name *(optional)*: _____
12. If you provided your name, may we contact you directly if we have any further questions? Yes or No *(please circle one)*
13. If you have any other comments, please write them below:

4.5. List of Interviewees for Child Health Services Project

- Rob Nordgren, MD, MPH, Executive Director CHS
- Martin Boldin, Director of Social Services CHS
- Marjorie Zygmunt, Director of Administration CHS
- Rhona Omara, Office Manager CHS
- Lisa Jordan, Director of Business Operations Elliot Health System. Ms. Jordan is responsible for billing for all Elliot physician practices.
- David Li, Vice President Marketing and Strategic Planning Elliot Health System. Mr. Li was one of the original grant writers for the TOP Grant.
- Richard Morel, Epic Project Manager, Elliot Health System. Mr. Morel was the lead project manager who implemented the Epic system
- Rich Herman, Director of Operations and Finance, Elliot Physician Services.

4.6. Patient Summary Report

After Visit Summary:
Summary of Your Visit Today

Patient
TUTTLE, DORTS HR # EPN30356 DOB 06/28/1928 F

Date Time Clinician Seen Today Clinic/Dept
03/13/03 2:30 PM TUTTLE, MARY ANNE EHS/SHPC

During your visit today, we recorded the following information about you:

Pulse Respiration Blood pressure Weight
84/minute 16/minute 132/62 205 lbs

Height
5' 4"

Orders

Today's Orders
GLYCOHEMOGLOBIN
CORTISOL TOTAL
TSH

Future Orders
COMPLETE BLOOD COUNT [85025] Expires on 11/22/2002
CORTISOL TOTAL [82533] Expires on 4/12/2003

Medication as of 03/13/2003	Disp	Refills	Start	End
LOPRESSOR 100 MG OR TABS Class: Abstract	60	0	3/13/03	
Sig: 1 TABLET TWICE DAILY				
DECADRON 0.5 MG OR TABS Class: Print	2	0	3/13/03	
Sig: 2 TABLETS AT 11 PM				
ARICEPT 10 MG OR TABS Class: Fax	30	6	2/14/03	
Sig: 1 TABLET AT BEDTIME				
GLYBURIDE 2.5 MG OR TABS Class: Fax	30	6	2/14/03	
Sig: 1 TABLET DAILY				
LOTENSIN 40 MG OR TABS Class: Fax	30	6	2/14/03	
Sig: 1 TABLET DAILY				
XANAX 0.5 MG OR TABS Class: Phone In	60	1	2/14/03	
Sig: 1 tablet BID PRN				
ZYPREXA 5 MG OR TABS Class: Fax	30	6	2/14/03	
Sig: 1 TABLET DAILY				
Cosign accepted by BURNS, EMILY MD-PRABHAKAR on Fri Feb 14, 2003 3:02 PM				
ACTOS 30 MG OR TABS	30	6	2/14/03	

Page 1

Class: Fax

Sig: 1 TABLET DAILY

Cosign accepted by ~~BURNS, EMILY MD PPAP[88]~~ on Fri Feb 14, 2003 3:02 PM

LIPITOR 80 MG OR TABS 30 6 10/28/02

Class: Phone In

Sig: 1 TABLET DAILY

KENALOG 0.025 % EX LOTN 1 tu* 2 10/23/02

Class: Print

Sig: apply BID prn

ASPIRIN 81 MG OR CHEW 30 0 10/23/02

Class: Abstract

Sig: 1 TABLET DAILY

FERROUS SULFATE 325 MG OR CAPS 60 0 10/23/02

Class: Abstract

Sig: 1 po bid

DISPOSITION: Return visit in 3 weeks

PATIENT INSTRUCTIONS:

STOP FERROUS SULFATE